INTERACTION SYSTEM

Field of the invention

The present invention relates to an interaction system and to a
5 method of efficient interaction between service providers and
users, for example for allowing the efficient obtaining of
products and/or to ensure that users are offered the products
according to their needs. In this connection, a service
provider will generally be a supplier of products and/or
10 services, and a user will generally be a potential customer.

Background of the invention

Recently, several trends can be observed in the interface
between a user and a service provider.
15 Firstly, the Internet and other electronic means have opened
the possibility for so-called electronic shopping. Several of
these shopping possibilities are available for example via
Amazon.com or Tesco.com. These electronic shopping environments
have extensively been described in the prior art. For instance,
20 US-A-6,064,980 a discloses a recommendation service which uses
user profile information and filtering techniques for
recommending items to users of a Web site. Furthermore, WO-
00/17792 discloses a recommendation service which recommends
items to individual users based on a set of items that are
25 known to be of interest to the user, such as items previously
purchased by said user.

A problem with these traditional electronic shopping
environments is that they are supplier driven systems and do
30 not or only to a limited extent allow the adaptation of offered
goods and conditions according to the wishes of the customer.

Secondly so-called e-commerce auction based systems are used more often; these systems allow the user to bid for certain goods. These systems have the advantage that the user can indicate the price he is prepared to offer, after which the

5 supplier can decide whether said price is acceptable for the supplier. Such user driven trading systems are often more preferred by the users.

Thirdly with the rapid development of new media and
10 communication channels, companies are increasingly searching for new methods to provide targeted information relating to their goods to select groups of consumers or to obtain from selected consumers relevant information which may help to develop new products or services. However consumers are
15 increasingly aware of the value of information especially the value of their personal data and opinions.

There is therefore a need to provide improved electronic systems which are capable to provide a personalised, self-
20 adapting and custom interaction process which is efficient and which provides the possibility to the supplier to obtain the desired information and which allows the user to obtain a compensation for this information.

25 It has now been found that said need can be fulfilled by an improved system for interaction between a specific user and a supplier, involving business rules that specify the match between the user profile and the system response and also the desired outcome in terms of actions to be taken by the
30 customer. Furthermore, said system contains feed back means for updating these business rules based on the comparison between the desired and the observed behaviour by the customer.

Definition of the invention

Accordingly, the invention provides an electronic system for
interaction between a specific user and a service provider,
5 comprising:

   (a)   receipt means for obtaining information from the user for
        establishing a profile of said user;

   (b)   control means for the service provider for providing and
        displaying one or more system responses to the input
10   provided under (a);

   (c)   means for initialising one or more business rules for each
        type of system response, said business rules specifying
        the match between the system response and the user
        profile, and also the desired outcome in terms of actions
15   to be taken by the user;

   (d)   means for selecting the most appropriate business rule for
        the user, based on the input given under (a);

   (e)   means for observing the behaviour of the user; and

   (f)   feedback means for updating the business rules based on
20   the difference between the desired outcome and the actual
        behaviour by the user.

In another aspect, the invention provides a method for
improving interaction between a user and a service provider,
25 wherein said method uses a system according to claim 1 and
comprises the following steps:

   (i)   the user electronically provides information for
          establishing a user profile;

   (ii)   the system selects the business rule which is most
30   appropriate for the user based on the information given
          under (a);

(iii)   based on this business rule, the appropriate system
         response is provided and displayed;

(iv)   the behaviour of the user is observed and compared with
         the desired behaviour specified by the business rule;

5   and

(v)   based on the comparison between the desired and
         observed behaviour by the user, the business rule is
         updated.

10 The system and method of the present invention will now be
    described in more detail below.

Detailed description of the invention

    Systems in accordance with the invention provide an improved
15 way of interaction between a service provider and a user such
    that the needs of the user are better served. Furthermore, such
    interaction systems are designed to be personalised systems
    which are suitable to give each individual user what is best
    for him.

20 In this connection, a user of a system of the invention will
    generally be a potential customer who is looking for
    information about products and services.

    On the other hand such interaction systems also address the
25 business needs of the service provider. Through the
    availability of questions, such as market research questions,
    as possible part of the system response to the input provided
    by the consumer, the service provider obtains a better
    understanding of the user. Furthermore the system response to
30 the input by the customer can be better matched with the
    profile of said customer, after said questions have been
    replied to.

The system of the invention enforces a good design discipline
on the designer thereof: each offering needs to have specified
the business rule concerned, i.e. the ideal user whom that
5 system response is targeted to.

Furthermore, the interaction system of the invention is not
only a personalised system. It is also a self-adaptive and
learning system since it contains means for updating the
10 business rules based on the difference between actual observed
behaviour and desired behaviour.
For practical reasons, the electronic system of the invention
is preferably a computer system or a telecommunication system.

15 **The user profile**
The user profile consists of information about a specific user
of the system of the invention. The user profile desirably
comprises information selected from the group consisting of
purchase behaviour, demographics, habits, attitudes, needs,
20 preferences, certainty factor, psycho-graphics, linguo-
graphics, diagnostics and combinations thereof.
The user profile may be mapped into a representative space
using dimension reduction techniques such as graphical
modelling, and multidimensional scaling. If applied, this
25 mapping should take into account the uncertainty of the data in
the user profile and the missing values.
Furthermore, if mapping techniques are applied, then each
individual user is a point in a representative mapping space.

30 **The system responses**
When the method of the present invention is being carried out
by a user, the system selects the business rule that is most
appropriate for the user based on the profile provided by said

user, and based on this business rule the appropriate system
response is provided.

In general, the system responses are selected from the group
consisting of providing information content, offering a

5 marketing lever, asking questions, and combinations thereof.
The information content to be provided as system response, may
be any relevant information such as the indication of a Web
page, fashion information, a recipe, a description of a
product, a comparison between various products or combinations

10 thereof. The information may also contain games and
entertainment.

The marketing lever to be offered as system response, is
preferably selected from the group consisting of product
promotion, a free sample, a free service and combinations

15 thereof. The product promotion will usually include a discount
of the price.

The questions raised as part of the system response, may
effectively be used for electronic market research purposes.

20 **The business rules**

The system of the invention comprises one or more business
rules for each type of system response. In connection with the
present invention, such business rules are designed to be a
description of the 'ideal' user for whom the specific system

25 response concerned has been designed. In other words, each of
the business rules is used for specifying the match between the
system response and the related user profile of an actual user
who operates the system of the invention.

The business rules also specify the desired outcome in terms of

30 actions to be taken by the user. This desired outcome may
include the following actions: reading of the information
provided, taking up of the promotion offered, or answering of
questions raised.

The desired outcome may also include behaviour of the user at
some later date, e.g. the purchase of a product some weeks
later when it is no longer on promotion.

5   When a user operates the system of the invention, said system
selects the business rule or rules that are most appropriate of
that user, by evaluating the distance between all business
rules and the user profile provided by said user.
These one or more business rules are subsequently initiated and
10 the appropriate system response is provided and displayed for
the user.
The behaviour by the user is then observed and compared with
the user profile concerned, and if needed, the user profile may
be suitably updated.
15 Furthermore, the difference between the desired outcome and the
observed behaviour is used for updating the business rules that
were initiated. A number of algorithms may be applied for
calculating this difference and for carrying out this updating.
These new updated business rules may also be suitably analysed
20 for gaining information on changes in user behaviour.

The invention will now be illustrated in the following
examples.

Example 1

This example relates to the marketing of Pepsodent toothpaste
(with a toothbrush) in rural India, whereby the system of the
invention is used.

5 In India, the so-called "Neem-Stick" is currently generally
used for tooth brushing purposes. In the present example, the
electronic interaction system of the invention is used for
informing potential customers about Pepsodent toothpaste,
aiming at higher sales thereof.

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The user profile is designed to contain the following items:

(1) Pepsodent usage

(2) Own TV and/or radio, or none

(3) "Neem-Stick" usage

15 (4)-(6) confidence levels of (1)-(3) above.

4 users have completed this user profile and their resulting
specific user profiles are as follows (on a range of 0-1, "0"
being fully negative and "1" being fully positive):

20	(1)	(2)	(3)	(4)	(5)	(6)
user (a)	0	0.75	0.67	1.0	0	0
user (b)	0	0.75	1.00	1.0	0	0
user (c)	0	1.00	0.50	0	1.0	1.0
user (d)	0	0.50	0.50	0	1.0	1.0

25

It is noted that item (2) is included in the user profile so as
to measure the extent of affluence of the users.

The system contains the following response types:

30 1) Here is a promotion of Pepsodent

2) Here is some information about oral health

3) Here is a film clip to watch

4) Do you use Pepsodent; yes=3, smtms=2, no=1

5) Do you have a TV/radio: TV=3, radio=2, none=1

6) Do you use a "Neem-Stick": yes=3, smtms=2, no=1

5 It is noted that "smtms" means 'sometimes'.

Each response type is assigned three Business Rules as a
weighting in the space of the user profile.
The Business Rule (BR) weightings for response types 1)-3) are
10 used for matching purposes with respect to items (1)-(3) in the
user profile.
These BR weightings are:

	(1)	(2)	(3)
i-BR	0.20	0.80	0.50
ii-BR	0.10	0.55	0.90
iii-BR	0.50	0.20	0.50

The first user logs on the system.
For this user, it can be seen that the first Business Rule i-BR
20 gives the best match with his user profile.

For this 1st user , the system action includes the offering of a
promotion for Pepsodent.
At some later date, the system asks this 1st user the following
25 question so as to observe his behaviour:
Have you now bought Pepsodent full price?; yes=3, smtms=2,
no=1.

It is noted that the desired behaviour for the user is to buy
30 Pepsodent full price. The observed behaviour, in this case, is
measured by this question. The difference between desired
behaviour and actual observed behaviour (to be used in further

operation of the system) is calculated based on the table of
responses below:

User's Answer	Interface	Difference in behaviour
Yes	3	1
Sometimes	2	0
No	1	-1

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The 1st user actually replies "yes", by clicking on "3".

With this positive response by the 1st user, the first Business

10 Rule weightings are updated by the system, and the resulting

values are:

                (1)   (2)   (3)
i-BR   0.0916   0.7729   0.5903

15 For this updating, the following calculations have been carried

out.

The Euclidean distance between user (a) and i-BR is the
Euclidean distance between

20   [0   0.7500   0.6667] and
        [0.2000   0.8000   0.5000]
which equals 0.2651. This is called 'Edist'.

Then, lambda is set to be: $5*(Edist + 3)^{-3}$

25   = 0.1436

Subsequently, the unit vector between user (a) and i-BR is
calculated as follows:
Unit vector = (user (a) - i-BR)/Edist;

$$= [-0.7544 \quad -0.1886 \quad 0.6287];$$

Finally, the new Business Rule is calculated by:

i-BR (new) = i-BR +

5   difference in behaviour*lambda*unitvector

$$= [0.0916 \quad 0.7729 \quad 0.5903]$$

Example 2

10 This example describes the situation, wherein the 1st user is
known to the system of the invention, since this user has –
amongst others- operated the system as described in Example 1.
After the 1st user has again logged on to the system, the system
reacts by displaying the following:

15 "Welcome back, user (a), I have some things you may be
interested in These include:

- a promotion for your favourite Thai cooking sauce;
- a preview of a recent song release by one of your favourite
  artists;

20 - five short questions to answer. In return, we will offer you
  a free sample of a conditioner, and can provide a better
  interactive service in future.

User (a) selects the promotion of the Thai cooking sauce and
25 agrees to answer the five questions.
These actions are logged by the system, as are any of the
previous and further interactions and actions by user (a).
Furthermore, the responses by user (a) to the 5 questions are
analysed by the system (i.e. compared with the expected/desired
30 responses), and any relevant business rules are updated, as
needed.

Next time that user (a) runs the system of the invention, there will be a new set of offerings depending on the analysis of previous interactions.

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